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obtained with several gases; among them carbonic oxide is the most worthy of note, as with it effects are produced similar to those with the mixture of oxygen and hydrogen, viz. oxidation when the plate was positive, and reduction when it was negative.

The author's theory or mode of explaining the results is as follows. The discharges are successive, not continuous, and antecedent to each discharge the intervening gas is thrown into a state of chemical polarity, similar to that which takes place in an electrolyte anterior to electrolysis; by this means the positive terminal has in juxtaposition with it oxygen or an electro-negative gas; the discharge takes place, and by the superficial ignition the layer of oxygen combines with the metal in contact with it.

Conversely, when the oxidated surface is negative and in contact with an electro-positive gas, the heat of the discharge produces reduction. The fact of oxidation only taking place when air or oxygen alone are present, and reduction only when hydrogen is present, he considers irreconcilable with the effects being attributable to the discharge itself, or to their being regarded as analogous to electrolysis; while these phenomena are corroborative of the view he puts forth.

The author refers to the experiments of Priestley, Karsten and others, in which spots or marks have been shown to be produced by electrical discharge, but which do not otherwise bear upon the objects sought to be elucidated by this paper.

The Society then adjourned to April the 22nd.

April 22, 1852.

The EARL OF ROSSE, President, in the Chair.

G. E. Day, M.D., was admitted.

The following papers were read :—

1. "On the Structure of the Stem of *Victoria regia*." By Arthur Henfrey, F.L.S. &c. Communicated by Professor Edward Forbes, F.R.S. Received February 19, 1852.

The investigation of the anatomy of *Victoria regia* acquires its interest from the fact of the relations which have been pointed out to exist between the Nymphæaceæ and some of the undoubted Monocotyledonous families, especially also from the researches of M. Trécul on the anatomy of *Nuphar lutea*, which plant that author describes as having a stem of the Monocotyledonous type of structure. Through the unfortunate death of the plant of *Victoria regia*, which had flowered for some time in the gardens of the Royal Botanic Society of London, the author had an opportunity of examining the anatomy of its stem. It is an upright rhizome, with undeveloped internodes, growing by a single terminal bud, apparently perennially, and attaining considerable thickness; on the outside it bears the remains of the petioles and flower-stalks, which separate by disarticulation, and their remains are found arranged in

spiral lines upon the outside, so as to give the short, thick rhizome the aspect of a piece of a palm stem. As in *Nuphar*, the roots are produced in bundles at the bases of the petioles, and fall off successively upwards as the new ones are developed, leaving very conspicuous scars. The internal structure of the stem is quite Monocotyledonous in its character, presenting no trace of the arrangement of the vascular bundles into rings of wood, no true woody fibres, and no cambium layer. The vascular bundles, which are composed exclusively of spiral, annular and reticulated ducts surrounded by elongated parenchymatous cellular tissue, are isolated and arranged just as in Monocotyledons, such as the Palms; and the outer part of the stem exhibits a cortical parenchyma, much more like that of the herbaceous rhizomes of the rush-like plants, than any other known structure; it bears not the least resemblance to the bark of Dicotyledons. The results of the investigation show that *Victoria*, like *Nuphar*, has a stem of essentially Monocotyledonous structure. The paper was accompanied by drawings illustrating the general and microscopic anatomy of the stem.

2. "On the Meteorology of the English Lake District, including the results of Observations on the Fall of Rain at various heights, up to 3166 feet above the Sea-Level:" Fifth paper, for the year 1851. By John Fletcher Miller, Esq., F.R.S. &c. Received March 1, 1852.

The author states that the results for the past year do not seem to call for any particular remarks, and as it appears desirable, as a general rule, to defer all attempts at deduction until after the completion of the observations, the Tables for 1851 are presented, without many notes or comments, in continuation of the series which have previously appeared in the Transactions of the Society. The table for January, 1851, is given as an example of the daily fall of rain in the district during an excessively wet month, and also as showing the form of permanently registering the returns from the various stations, when sent in at the close of each month. He remarks that the quantity of 38·86 inches precipitated on "The Styne" in January 1851, is, he believes, without a parallel in the temperate zone.

3. "Formulization of Horary Observations presumed *à priori* to be nearly of a Periodic nature." By S. M. Drach, Esq., F.R.A.S., F.R.G.S. Communicated by Colonel Sabine, R.A., Treas., V.P.R.S. &c. Received March 18, 1852.

Referring to his former publications on the subject (Proceed. Roy. Soc. March 1842, Phil. Mag. 1842-51), the author empirically resolves the formula

$$ht = H + \Sigma A_i \sin it + \Sigma a_i \cos it = H + \Sigma R_i \sin (it + \psi_i),$$

h being the effect observed at the hour-angle t , thus obtaining from the 24 hourly observations all values up to $i=12$. This method giving the values of A_i, a_i, R for the different months, he believes that by it the law of change connected with the sun's motion in